

HANFORD BERYLLIUM QUESTIONS AND ANSWERS

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What is beryllium? Prop of

Beryllium is a hard, grayish metal. In nature, beryllium can be found in compounds in mineral rocks, coal, soil, and volcanic dust. Beryllium compounds are commercially mined, and the beryllium purified for use in electrical parts, machine parts, ceramics, aircraft parts, nuclear weapons, and mirrors. [Beryllium info sheet, Agency for Toxic Substances and Disease Registry]

Why was it used at Hanford?

Beryllium has some unique chemical properties, including high thermal conductivity, corrosion resistance, and good neutron moderation, that enable it to be used where no other materials are appropriate, including in nuclear weapons. [Los Alamos Beryllium info (internet), Lawrence Livermore Beryllium info (internet)]

What are the health hazards of working with beryllium?

There are two different diseases associated with beryllium exposure, Acute beryllium disease occurs from exposure to very high levels of airborne beryllium particles. This disease is a form of chemical pneumonia which occurs soon after exposure. This disease is similar to other forms of pneumonia, and respond well to treatment once exposure has terminated. Because of the high levels of exposure necessary for acute beryllium disease, there is virtually no acute beryllium disease today.

A second disease associated with beryllium is known as chronic beryllium disease or CBD. CBD is basically a hypersensitivity or allergic condition in which the tissues of the lungs become inflamed with a cellular nodular reaction. CBD only affects a small percentage of the people who work around beryllium, with more people affected at higher exposure levels. CBD is associated with exposure to beryllium dusts or fumes over a period of time. It can develop as quickly as a few months after exposure, or may take as long as 40 years.

Besides these two beryllium diseases, there is a condition known as beryllium sensitization. A person with beryllium sensitization may show no symptoms of disease. The fact that they are sensitized means that their body does react to beryllium, and they are at an increased risk of developing CBD in the future. [Beryllium: Biomedical and Environmental Aspects, Fact sheet from National Jewish Center on Beryllium, Beryllium MSDS, Brush Wellman]

Are we still using beryllium at Hanford?

No, there are no active beryllium operations at Hanford. Beryllium was used at Hanford from about 1900 until 1980. However, it is still possible that some beryllium may be present in some facilities from past usage. This could include fume hoods, exhaust ducts, etc.

What about using non-sparking tools? I've heard they contain beryllium. Do they present the same hazard?

No, the risk from non-sparking tools containing beryllium is much lower. Although it is possible to ingest beryllium and skin contact with beryllium may cause some irritation, by far the greatest hazard in working with beryllium results from breathing beryllium dust or fumes. Although non-sparking tools may contain beryllium (typically up to about 2%), the small amount of beryllium contained in the material is not likely to be released as a dust or fume. As such, any beryllium-containing products, such as tools, do NOT present significant hazards UNLESS they are treated in such a manner that they release beryllium fumes or dust. Normal use of a non-sparking tool containing beryllium would not generate enough dust to be a significant hazard. However, if welding, cutting or grinding were performed on the non-sparking tool, it would be possible to produce hazardous levels of fumes or dusts containing beryllium, particularly if the dust/fumes were in an enclosed area.

Do most people who work with beryllium end up with disease?



No, most people who work with beryllium do not end up with beryllium disease. Even with routine high level exposure to airborne beryllium, only about two percent of the people who work around beryllium will ever develop beryllium disease. A higher percentage of people (around five percent) who worked around beryllium will develop beryllium sensitization. Because there are generally no symptoms associated with beryllium sensitization, most of these individuals would not be identified unless they would tested for beryllium sensitization. [Fact sheet from National Jewish Center on Beryllium]

Am I more likely to develop beryllium disease if I worked around higher concentrations of beryllium?

Yes, based on the studies performed to date, those individuals who worked around high levels of beryllium are more likely to both become sensitized to beryllium and to develop CBD. For example, at Rocky Flats, 1.9 percent of the individuals with beryllium exposure showed sensitivity to beryllium while 7.4 percent of employees with measured high level exposure to beryllium showed beryllium sensitization. [Fact sheet from National Jewish Center on Beryllium]

What are the symptoms of beryllium disease? important

As noted above, beryllium disease generally refers to CBD, as acute beryllium disease is now very rare. The primary signs and symptoms of beryllium disease are:

- 1. symptoms of cough or shortness of breath, especially with exertion.
- 2. evidence of sensitization to beryllium as measured in the blood or in the lung washings with a test called the lymphocyte proliferation test (LPT)
- 3. development of many small lung scars seen on chest x-ray
- 4. a special kind of scar called a granuloma, which is found in lung biopsy tissue examined with a microscope
- 5. abnormalities in pulmonary function (breathing) tests
- 6. abnormal lung sounds heard with a stethoscope

I've heard that there's a simple blood test that will tell me if I have beryllium disease. Is this true? $\frac{1}{2} \log_{100} \alpha$

No, there is a blood test, called a lymphocyte proliferation test (LPT) to test for beryllium sensitization, however, it is not simple, in that it involves exposing live cells from a persons blood to beryllium and determining if certain cells in the blood (lymphocytes) proliferate. The test can only be performed at specially equipped labs, and the sample must be quickly shipped to the laboratory while the cells are still alive.

An LPT will indicate sensitization to beryllium. Sensitization is not the same as disease. A diagnosis of beryllium disease can be made only after performing other special tests and considering other factors, such as beryllium exposure history, and the other symptoms of beryllium disease. Thus, a positive result on an LPT does not indicate the person has CBD. The person may never develop CBD. However, the person would be at a greater risk of developing CBD than a person who tested negative. [Fact sheet from National Jewish Center on Beryllium]

Should I take the blood test to see if I have beryllium disease if I've worked around beryllium?

The blood test you refer to is known as a Lymphocyte Proliferation Test, or LPT for short. The LPT test is designed to identify people who are sensitive to beryllium. It does NOT (by itself) indicate that a person has a disease associated with beryllium, though it can be used with other information, such as exposure symptoms, to make a diagnosis of beryllium disease. It also does NOT indicate that a person who tests positive will eventually develop a beryllium-related disease, although they are more likely to develop a disease than someone who tests negative. So the test is more of a predictor of increased risk of developing beryllium disease than a test of whether a person does or doesn't have beryllium disease.

Another problem associated with the LPT test is that the test has a significant percentage of false positives and false negatives. False positives are people who show positive on the test, but are not actually sensitive to beryllium. False negatives are people who show negative on the test, but are actually sensitive to beryllium. Thus, a positive test result means that the person is PROBABLY sensitive to beryllium. The greater the exposure, the more likely the test will be a true positive. On the other hand, the less the exposure, the less likely the test will give a true result. It is also much more likely to be a true positive if high exposure has occurred and the person has symptoms or findings on physical evaluation consistent with CBD. However, for people with no symptoms who have only trivial exposure to beryllium, the likelihood of a false positive test must be weighed against the risk and discomfort of more extensive testing that will follow with little or no chance of having the disease. [Fact sheet from National Jewish Center on Beryllium]

I saw a list in the newspaper of buildings where beryllium may have been used. Am I likely to develop beryllium disease because I worked in one of these buildings?

The simple answer to this question is no. Not all of the facilities that were listed actually worked with beryllium. And the facilities that did work with beryllium only worked with it for a specified period of time. So many of the people who worked in these buildings were not there while the beryllium was being used.

And even for those people who did work in the facility during the time beryllium was being used, they may not have worked in an area contaminated with beryllium. If they did work in a beryllium contaminated area, they may not have received significant exposure unless they performed operations that generated airborne beryllium. And finally, even for those employees who were exposed to high levels of beryllium for a long period of time, at most about about five percent will ever develop CBD.

So, the odds are pretty good that, even if you worked in one of these facilities, you will not develop CBD. However, if you are one of those employees who did work around high levels of airborne beryllium, we do need to identify you so that we can enroll you in a medical surveillance program. Although the odds of developing CBD are small, we want to ensure that, for the individuals who do develop CBD, they are properly diagnosed as quickly as possible, and appropriate treatment provided. [Fact sheet from National Jewish Center on

Beryllium]

Is there a method to prevent workers who worked with beryllium from developing beryllium disease? █ਾਲੂਰੂ

No, at the present time there is no way to prevent employees from developing CBD who have worked around beryllium. This is true regardless of whether they have been given an LPT test. However, once the disease has started, early treatment may slow the course of the disease. There is no evidence at present to indicate treatment of a sensitized person without disease will affect the probability or speed of disease development. [Fact sheet from National Jewish Center on Beryllium]

What is the treatment for beryllium disease? igg of

The primary treatment for CBD is to give the patient a steroid called Prednisone, which fights inflammation. Treatment with steroids usually causes the disease to stabilize, and often improves symptoms. [Fact sheet from National Jewish Center on Beryllium]

Are the major contractors developing a plan to address beryllium, and what will it contain?

Yes, the prime contractors at Hanford are currently meeting to finalize a plan to address beryllium at Hanford. This plan will involve identifying facilities where beryllium was used, developing an employee questionnaire to help determine which employees had significant beryllium exposure, and setting up medical surveillance procedures for employees with potential beryllium exposure. They are also looking at what mechanisms can be used to communicate beryllium information to employees. The programs for addressing beryllium may differ between the prime contractors, but should involve the above steps.

Do we have any data on the beryllium levels present at Hanford during the beryllium operations?

We are currently reviewing past studies to determine beryllium levels at Hanford. Based on preliminary data review, nearly all of the operations that occurred at Hanford for which we have sampling data were below the OSHA Permissible Exposure Limit for beryllium, which is, and was, 2 micrograms per cubic meter. However, some of the data reviewed indicate levels above this level, and we are looking for additional information to indicate whether these operations occurred in a hood, or personal protective equipment was worn.

Where should I go if I want additional information about beryllium?

There are several sources of information available. An Internet web site has been created for Hanford to provide information on beryllium. The internet address is http://www.hanford.gov/safety/beryllium/index.htm. This site contains specific information on beryllium at Hanford as well as links to general beryllium information. If you need specific medical information, you should contact HEHF If you have specific questions relating to industrial hygiene or beryllium

exposure, you should contact your industrial hygienist.

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